Ecological footprint (EF) is a concept to measure anthropogenic influence of individuals, regions, states and society on environment, which is expressed by units of global hectares (gha). Global hectares are calculated from the equivalent number of hectares of biologically productive area, which ensure the needs of person, cities, regions or states. The calculation includes all the anthropogenic activities using renewable natural resources. EF also examines and quantifies the area needed for carbon sequestration. EF is calculated from six land use types – cropland, grazing land, forest for timber and fuelwood, fishing grounds, built-up land and forest for carbon dioxide uptake. Plants, as participants in a number of important processes on the Earth and the base of the food pyramid, can significantly modify the final EF through the value of their net primary production (NPP). Yield factors and equivalence factors are used to transfer different areas productivity (forest, cropland, grazing land, etc.) to get land use types in global hectares.

The aim of the present thesis is to make a review of the concept of ecological footprint and its calculation methodology especially the effect of variability in NPP of plants in ecosystems. The influence of ongoing global climate change can affect NPP of plants and this can then affect future estimates of EF.

The concept of ecological footprint and the explanation of conversion from hectares to global hectares are summarized in the first chapter. The influences on biomass production are defined in the second chapter based on general knowledge about the physiology of plants. The third chapter describes land use types in ecological footprint. The importance of plants for determination of ecological footprint is discussed in the fourth chapter based on land use types. In the last chapter, other concepts regarding sustainability are discussed – ecosystem services and green gross domestic product, also the role of remote sensing in improving the EF calculation sensitivity is mentioned. In conclusion, primary production of plants is irreplaceable in the concept of ecological footprint and in the majority of processes on Earth.

Keywords: biocapacity, Czech republic, net primary production of plants, ecological footprint, photosynthesis, global hectar, land use types, forests, cropland, grazing land, ecosystem production, biomass production